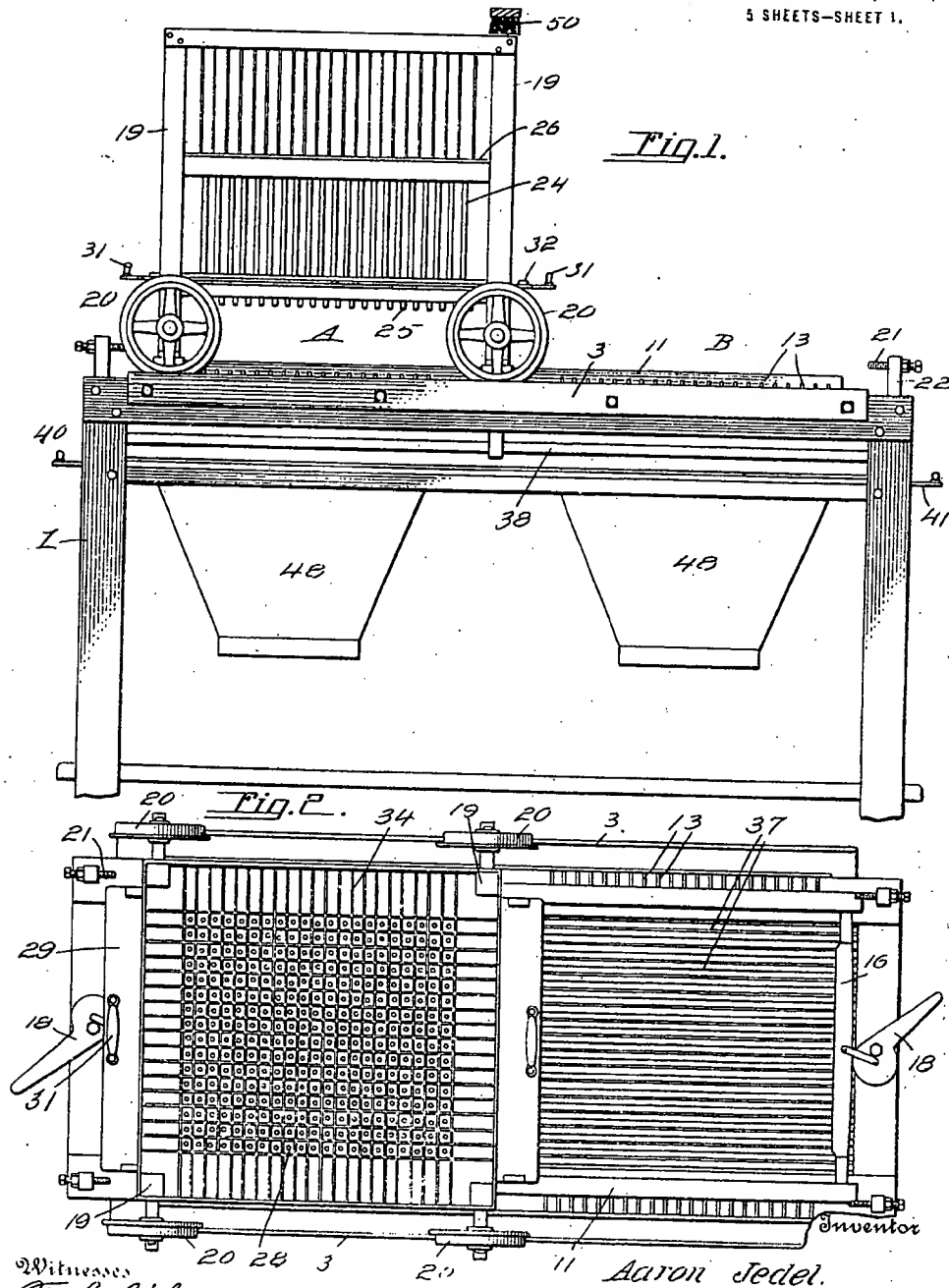


A. JEDEL.  
 COMBINED RACK FILLING AND CARTON LOADING MACHINE.  
 APPLICATION FILED SEPT. 21, 1917.

1,258,012.

Patented Mar. 5, 1918.  
 5 SHEETS—SHEET 1.



Witnesses  
 H. C. Gibson.

A. C. Hines.

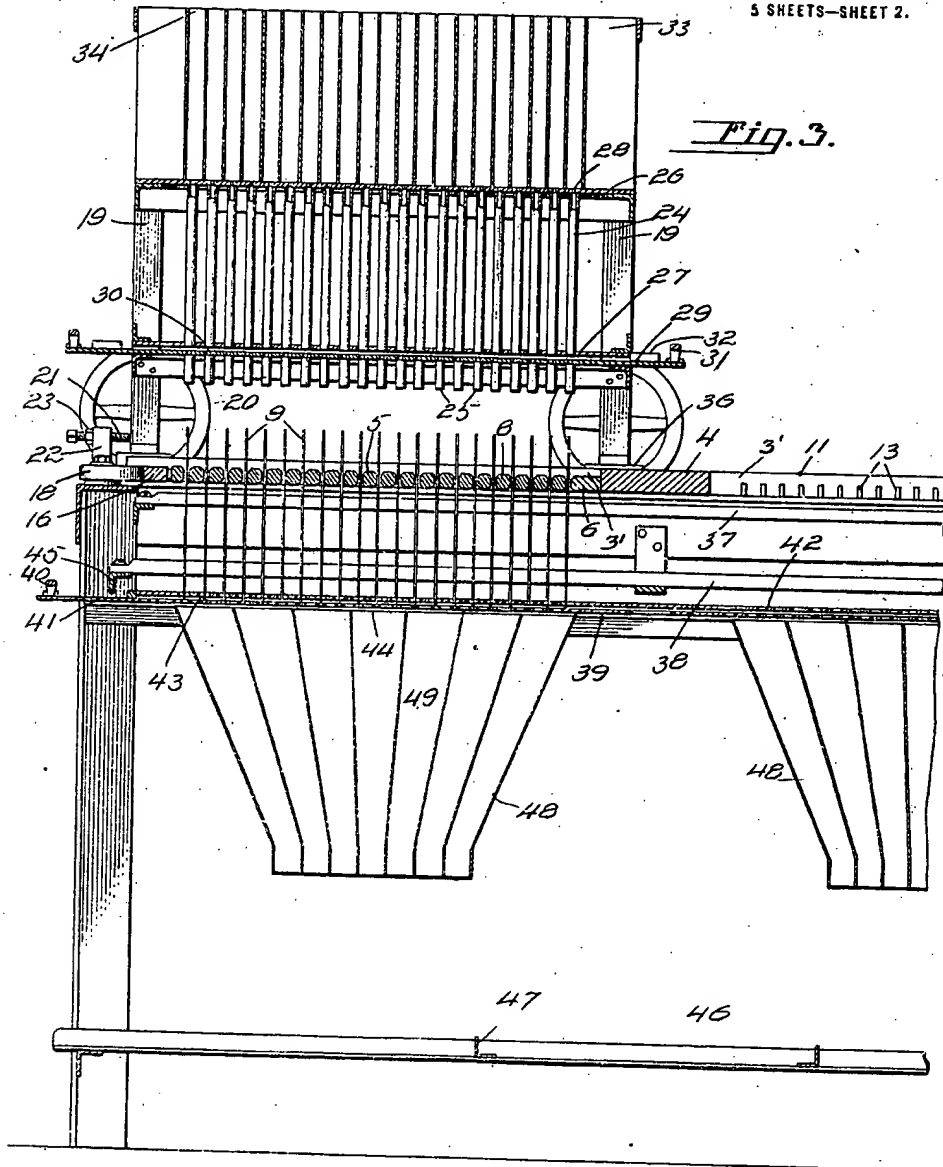
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Witnesses

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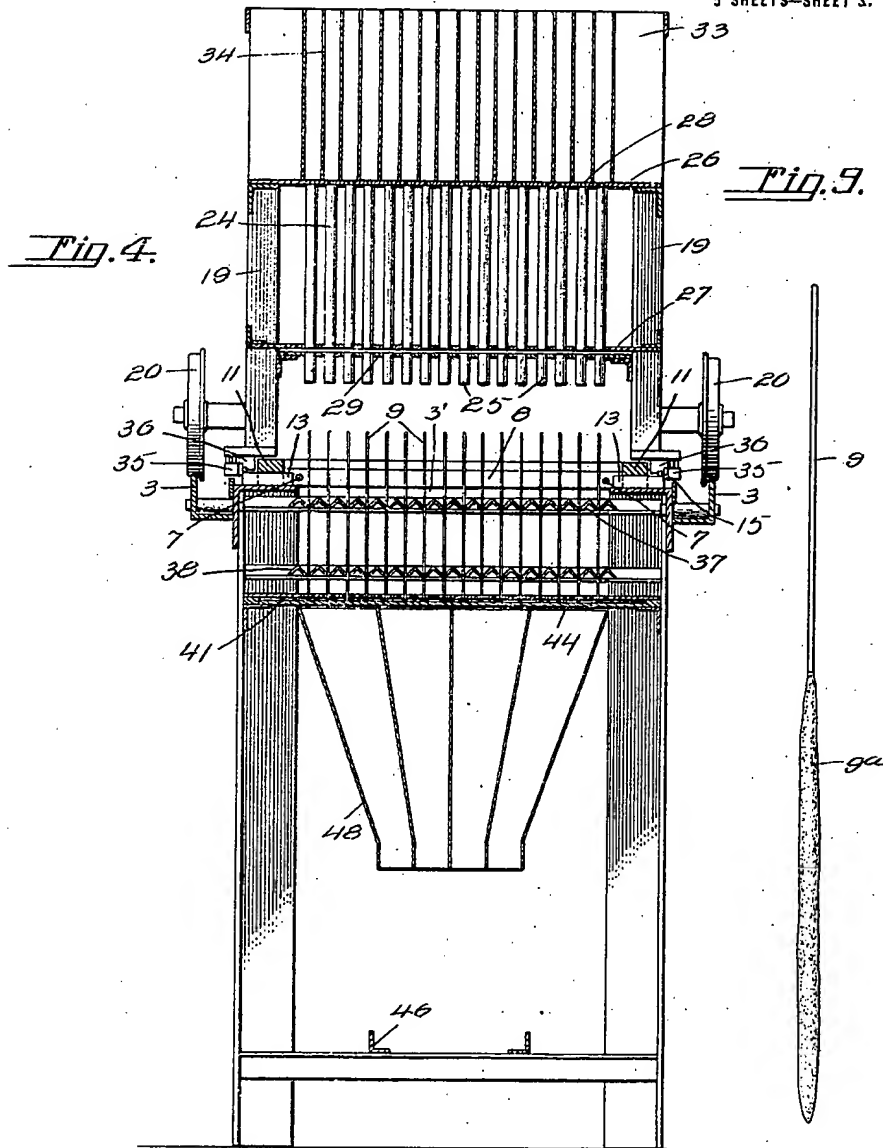
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 5 SHEETS—SHEET 3.



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 3 SHEETS—SHEET 4.

Fig. 5.

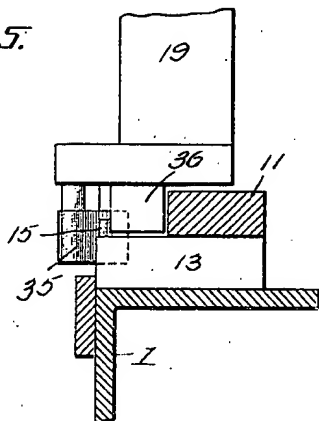


Fig. 6.

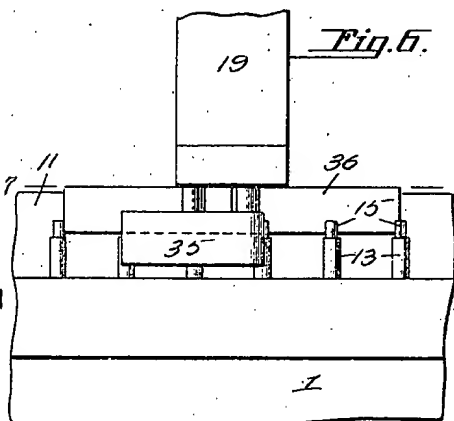


Fig. 7.

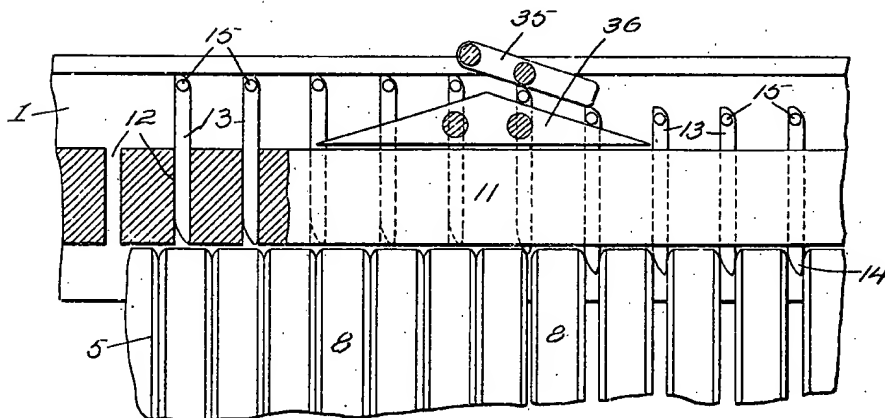


Fig. 8.

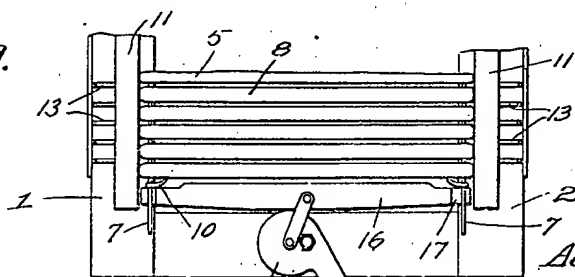
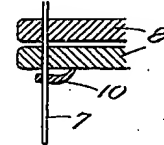


Fig. 10.



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 5 SHEETS—SHEET 5.

Fig. 11.

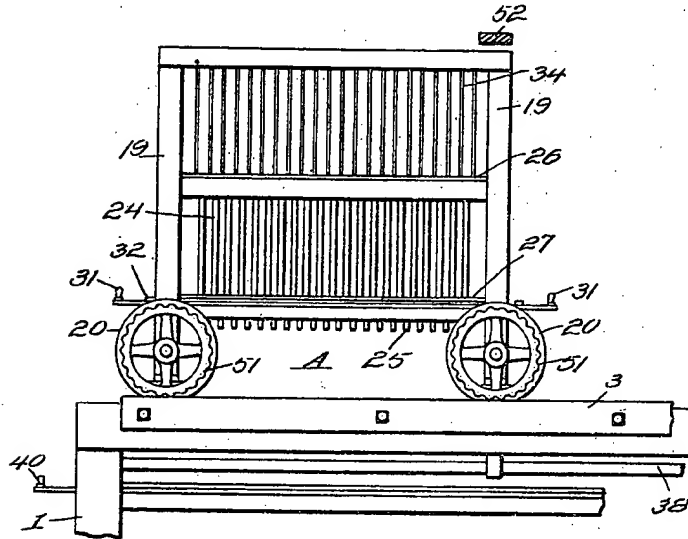
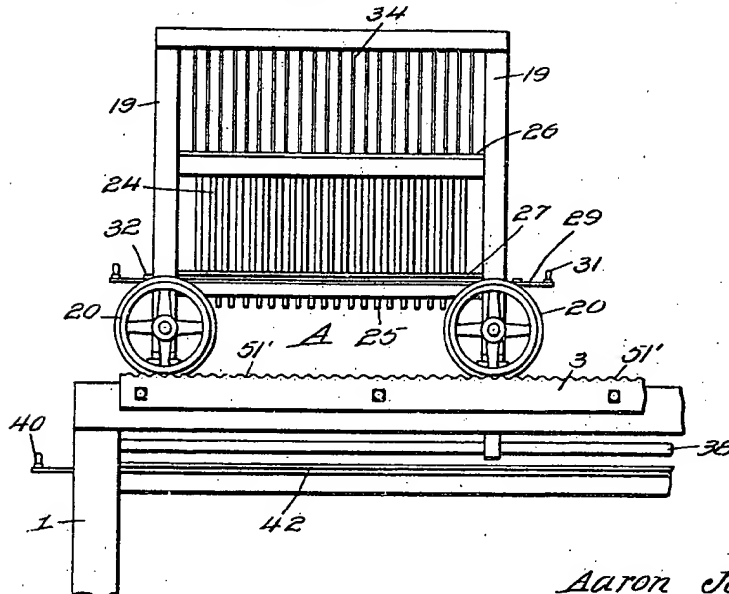


Fig. 12.



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## UNITED STATES PATENT OFFICE.

AARON JEDEL, OF NEW YORK, N. Y.

COMBINED RACK-FILLING AND CARTON-LOADING MACHINE.

1,258,012.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed September 21, 1917. Serial No. 192,827.

*To all whom it may concern:*

Be it known that I, AARON JEDEL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Combined Rack-Filling and Carton-Loading Machines, of which the following is a specification.

My invention relates to a combined rack filling and carton loading machine, and resides particularly in the provision of a machine for successively feeding wires to a dipping rack in which the wires are clamped and held while they are being dipped in and coated with a desired composition, such as a pyrotechnical composition, and for subsequently filling or loading the coated wires or pyrotechnical devices so produced into cartons or boxes for transportation and dispensation.

The primary object of the invention is to provide a machine whereby a maximum number of wires may be supplied to and held in a dipping rack, so that a large number of wires may be handled and coated at a time.

A further object of the invention is to provide a machine whereby the operations involved in successfully filling racks may be easily, quickly, conveniently and economically carried out.

A still further object of the invention is to provide a machine for the purposes specified which is simple of construction, reliable and efficient in action, and susceptible of production at a comparatively low cost.

A still further object of the invention is to provide a machine in which the operations are to a large extent automatic and the construction of such a character as to reduce the liability of choking or binding of the feeding wires to the minimum.

A still further object of the invention is to provide a machine of the duplex type and consisting of two rack supporting and carton loading devices in a single structure, combined with a movable wire feeder common to both structures, whereby during the period of the removal of a filled rack from one filling and loading device and the application of another rack the other filling and loading device may be actuated, the arrangement thus being such that the two filling and loading devices may be alternately operated to keep the machine in constant action.

A still further object of the invention is to provide a machine which may be employed for loading or filling definite numbers of the coated wires or articles into cartons or boxes of a prescribed size, thus obviating the necessity of manually loading the cartons or boxes and counting the coated wires or articles to be loaded therein.

A still further object of the invention is to provide a machine which may be employed for both filling and loading operations, or either one independently of the other, as desired.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts herein fully described and claimed, reference being had to the accompanying drawings in which:—

Figure 1 is a side elevation of a filling and loading machine embodying my invention, showing the feed carriage arranged in position for coöperation with one of the sets of filling and loading devices at one end of the machine frame.

Fig. 2 is a top plan view of the same.

Fig. 3 is a vertical longitudinal section through a portion of the machine on an enlarged scale with the parts in the position shown in Figs. 1 and 2.

Fig. 4 is a vertical transverse section through the machine.

Fig. 5 is a detail transverse section on an enlarged scale showing one of the spreaders and the coöperating spreader cams.

Fig. 6 is a side elevation of the parts shown in Fig. 5.

Fig. 7 is a sectional plan view on an enlarged scale looking down upon the rack and a portion of the machine frame, and illustrating the action of the spreading devices.

Fig. 8 is a fragmentary plan view of one end of the rack.

Fig. 9 is a view of one of the dipped or coated wires.

Fig. 10 is a fragmentary detail view of the rack.

Fig. 11 is a side elevation showing a modification in the means for vibrating the wires.

Fig. 12 is a similar view showing another modification for performing the same function.

In the practical embodiment of my invention, I provide a suitable frame structure, 1,

preferably of oblong rectangular form and made in whole or part of angle metal or other suitable material. The upper portion of this frame is constructed to provide a work table 2, at the opposite sides of which are track rails 3 extending substantially the full length of the table. In the present instance I have shown a duplex type of machine, that is, one having independent sets of rack filling and carton loading devices at opposite ends of the frame or on opposite sides of the transverse center thereof. For convenience of description these different devices are designated A and B, respectively, and it will be understood that two or more of these sets of devices are preferably employed in a single machine structure, although the machine may be restricted to a single set of working devices if desired. Also, if desired, the carton loading means may be dispensed with, as, so far as the filling mechanism is concerned, this may be employed without other adjuncts.

At each end of the frame is provided an opening 3', the openings at the opposite ends of the frame being separated by a cross head or abutment 4. Each opening 3' is substantially coextensive in size with an oblong rectangular filling rack or tray 5, which is adapted to rest upon the surface of the table at the sides and one end of the opening and to bear at its opposite end against the abutment 4. The rack is conveniently constructed of a transverse head bar 6 to which are fixed at one end a pair of spaced parallel rods or wires, on which wires are strung or slidably mounted cross slats 8, the series of cross slats being apertured at their ends for the passage of and to slidably engage the rods. The cross slats are adapted to be spaced to receive between them the wires 9 to be held or clamped thereby for the dipping or coating operation. Holding dogs 10 of the sliding and pivotal type are provided at the free ends of the rods 7 to engage the adjacent end slat to secure the series of slats in clamping position, as hereinafter fully described.

The rack 5 when placed in position upon the table and above the opening 3' is disposed between a pair of longitudinally extending retaining bars or rails 11 fixed to the sides of the table and serving to hold the rack against sidewise movement. These bars are provided with transverse guide passages 12 in which are fitted to slide spreaders 13 having beveled or tapered inner ends 14 and engaging pins or projections 15 at their outer ends. The ends 14 of the spreaders are adapted when the spreaders are projected inwardly to enter between and space the slats 8 a prescribed distance apart sufficient to receive the wires 9, as shown in Fig. 7, and upon the retraction of the spreaders the slats are adapted to be moved together to clamp

the wires 9 inserted between them. The means for closing the slats together comprises a push bar 16 having grooved or notched ends 17 slidably engaging the rods 7 and arranged to bear against the dogs 10, said bar being adjustable in and out by means of an eccentric 18 on the frame 1, whereby the dogs may be forced inwardly to crowd the slats together for a clamping action and to lock the same in such position, or whereby the slats may be freed or released for separation by the spreaders. The rack when fitted in position has its head bar 6 arranged to bear against the abutment 4, which forms a backing therefor, the rack being held when in use between said backing and the push bar, as will be readily understood.

The rods are fed or supplied alternately to the racks disposed above the respective openings 3' through the medium of a feed device comprising a longitudinally reciprocating feed carriage 19 embodying a suitable frame having wheels or rollers 20 to run upon the track rails 3 over the openings 5 in the ends or portions of the table forming part of the respective sets of filling devices A and B. The carriage when moved to its working positions over the respective openings 3' is adapted to abut against adjustable stop devices 21 comprising screws working in threaded openings in brackets 22 and adapted to be held in adjusted position by check nuts 23.

Supported upon the frame of the carriage is an upper set of long guide tubes 24 and a lower set of shorter guide tubes 25, the tubes of each set being arranged in alignment with each other. The upper and longer tubes 24 extend between and are fixed to supporting plates 26 and 27, the lower ends of said tubes extending through the plate 27 while the upper ends thereof register with openings 28 in the plate 26. The shorter tubes 25, on the other hand, are carried by a sliding cut-off or controlling plate 29 having openings 30 therein adapted by reverse movements of the cut-off plate to be adjusted into and out of registration with the tubes. The plate 29 is provided at each end with a handle 31 and a stop 32, whereby said plate may be adjusted and arrested at its limits of motion, in one of which the openings 30 are in register with and in the other of which said openings are out of register with the tubes 24. When the openings in the cut-off plate are out of register with the tubes 24, the wires contained within said tubes rest upon and are supported by the imperforate portions of the cut-off plate, while when said openings register with the tubes 24 the wires in said tubes drop by gravity downward through the openings and between the opened or spread slats 8 of the rack, as will be readily understood.

A hopper 33 is supported upon the plate 28 and provided with a series of wire receiving chambers or compartments 34, equal in number to the tubes 24 and openings 28, but of relatively greater diameter than said tubes or openings. These hopper chambers or compartments are filled with wires of the desired length and gage, and on each feed motion of the carriage the tubes 24 are each supplied with wires from the superposed hopper chamber by the vibratory action or jar caused by the contact of the carriage with the acting abutments or stops 21, one of the wires in the superposed hopper chamber being caused to pass downward through each opening 28 which is of such a restricted size as to permit only one wire to feed downward at a time. As the carriage is moved backward and forward over each rack it will thus be understood that the guide tubes 24 will be filled with a charge of wires which will be jarred downward thereinto by the violent contact of the carriage with the bumpers 21 against which it is forced, the charge of wires being supported by contact with imperforate portions of the retracted cut-off plate 29. As the carriage moves into working position above either rack, the slats of the rack are spread apart by projection of the spreaders 13, which are subsequently retracted, in a manner which I will now proceed to describe.

Mounted upon the carriage is a cam member 35 arranged for cooperation with a second cam member 36. These cam members have inclined surfaces disposed in parallel relation and at an oblique angle to the line of travel of the carriage to provide a correspondingly arranged guide passage, said inclined surfaces and guide passage being adapted for cooperation with the pins or projections 15 and the adjacent beveled ends of the spreaders 13, the arrangement being such that when the carriage moves in one direction the spreaders will be slid inwardly while on the reverse movement of the carriage the spreaders will be slid outwardly. When slid inwardly or projected the spreaders will force the slats 8 apart to an extent sufficient to permit the wires 9 to drop downward between and to an extent below them, as shown in Fig. 3, while when the spreaders are withdrawn or retracted the slats are adapted to be relatively adjusted to clamp the interposed wires. Thus when the carriage is in dropping position and the cut-off plate 29 is adjusted for a dropping action, the wires 9 will pass downward from the tubes 24 through the restricted openings 30 in the cut-off plate and also through the guide tubes 25 carried thereby and finally between the spaced slats 8, these operations being fully and clearly shown in Figs. 3 and 7.

Arranged below the openings 3' are in-

vented V-shaped deflectors or guide plates 37 and 38, which guide the wires 9 as they fall into contact at their lower ends with a bottom reciprocatory cut-off plate 39 having at each end an actuating handle 40 and a stop 41. The stops 41 are adapted for engagement with the ends of a stationary guide plate 42 having guide apertures 43 therein. The dropper or cut-off plate 39 is provided with dropper openings 44 to register with the apertures 43 when the cut-off plate is in dropping position, the imperforate portions of the plate being at other times below the openings 43 to support the charge of wires 9 which have been dropped from the carriage, the stop 41 at each end of the cut-off plate being adapted to engage the adjacent end of the plate 42 when the cut-off plate is in supporting position and being adapted to engage a stop flange 45 when the cut-off plate is moved outward to dropping position. When the wires 9 are thus extended through the spaces between the slats of the rack and supported by the cut-off plate the eccentric 18 may be operated to adjust the clamping bar 16 to move the dogs 10 inward to close the slats 8 to clamping position and to lock said slats in such position. The carriage is then moved from over the filled rack to a position over the unfilled rack at the opposite end of the frame and the filled rack detached for the dipping operation.

While an operator at one end of the frame is engaged in removing a filled rack at that end and setting an empty rack in position to be filled, another operator at the other end of the frame is engaged in filling a rack at that end in the manner hereinbefore described, three operators being generally employed, including an attendant whose duty is to keep the hopper chambers or compartments filled with wires and to assist in the operation of the carriage. The machine is thus adapted to be kept constantly in action for successively filling racks at the opposite ends of the machine frame, and as each rack will hold a large number of wires, say several hundred at a time, and as each rack may be filled within a comparatively short period of time, it is evident that a very large number of wires to be coated may be filled into racks within a given period at a comparatively low overhead cost.

I also preferably provide upon each machine, and in connection with each set of filling devices, means whereby the dipped wires may be discharged from the racks replaced upon the machine into cartons or holders, a prescribed number of the dipped and coated wires in each holder, so as to enable a large number of cartons or boxes to be filled without the necessity of counting the coated wires in the loading operation. The means employed for this purpose com-



prises a bottom supporting shelf 46 having portions arranged below the respective openings 3' and provided with cross bars or flanges 47 serving as gages or stops to maintain a rack of cartons or boxes in proper receiving position. Supported upon the frame above said portions of the shelf are droppers 48, each comprising a series of dropper tubes 49. These tubes 49 taper from their upper to their lower ends, and are preferably of angular form in cross section and so arranged that their upper ends will register with prescribed openings in the guide plate 42. When the cut-off plate 39 is moved to dropping position, upon the release of the coated wires 9 from the rack disposed within the superposed opening 3', the wires drop by gravity into the series of tubes 49 by which they are conducted by gravity into the respective cartons or boxes. As the perforated area of the plate 42 is blocked off, or arranged so that the perforations therein are located within different zones, a prescribed number of perforations to each block or zone, and as the upper ends of the dropper tubes register accurately with the blocks or zones, each with a determined block or zone, it will be evident that a fixed number of the coated wires, say one dozen, will pass into each dropper tube 49 and be conducted thereby into a carton or holder. This method of operation allows a very large number of cartons to be loaded in each loading operation with just the exact amount of coated wires to be loaded in each carton, thus avoiding the labor and expense of counting.

In Fig. 9 I have shown one of the wires 9 provided at one end with a coating 9<sup>a</sup> of the material with which it is to be coated, such as a pyrotechnical composition, the machine being particularly designed and adapted for producing what are commonly known as sparklers. It is to be understood, however, that the machine may be employed for other analogous uses, and that the wires instead of being dipped and coated at one end may be dipped and coated at both ends. To enable this to be done the wires may be supplied so as to project beyond both faces of the rack, so that the opposite ends thereof may be dipped into a tank containing the solution by a simple operation of inverting the rack after the depending ends of the wires have been coated.

Instead of relying simply and solely upon the contact of the carriage with the stops 21 to produce the jarring or vibrating action whereby the wires in the hopper are kept loosened up and fed to the guide tubes 24, I may employ other means for vibrating or shaking the wires. This may consist, as shown in Fig. 1, of an agitator 50 in the form of a brush arranged to engage the projecting ends of the wires contained in

the hopper tubes. Or, as illustrated in Fig. 11, the wheels 20 may be provided with corrugated surfaces 51 to run upon the rails 3, whereby the carriage will be vibrated vertically in its travel over the rails to perform the stated function. In lieu of corrugating the wheels 20, the rails 3 may be provided with corrugated surfaces 51' for the same purpose, as shown in Fig. 12. Another way of securing the result is to employ a permanent or other suitable magnet 52, as shown in Fig. 11, which may be used with or without the brush. This magnet will serve substantially the same function as the brush in attracting and momentarily holding the upper projecting ends of the rods in the travel of the carriage and until the rods are forcibly disengaged therefrom at a certain point in the travel of the carriage, by which the rods or wires will be kept in a loosened up condition for a free feeding action.

I claim:—

1. A machine for coating wires including a frame, a rack adapted to be supported by the frame, a hopper provided with a plurality of compartments to receive the wires to be supplied to the rack, and means for controlling the feed by gravity of the wires from the hopper to the rack.

2. A machine for filling racks with wires to be coated comprising a frame, a rack adapted to be supported upon the frame, a carriage mounted to travel upon the frame over the rack and having a plurality of hopper compartments, and means for controlling the feed of the wires by gravity from said hopper compartments to the racks.

3. A machine for filling racks with wires to be coated comprising a frame, a rack adapted to be supported upon the frame, a carriage mounted upon the frame so as to be positioned above the rack and having a plurality of hopper compartments, means for controlling the feed of the wires by gravity from said hopper compartments to the rack, and means for vibrating the wires in the hopper compartments.

4. A machine for filling racks with wires to be coated comprising a frame provided with rack supporting or holding means, a carriage mounted to travel upon the frame, a plurality of hopper compartments upon the carriage, guide tubes communicating with said compartments, and a cut-off controlling the passage of the wires from said guide tubes to the rack.

5. A machine for filling racks with wires to be coated comprising a frame provided with rack supporting means, a carriage mounted to travel upon the frame, a plurality of hopper compartments upon the carriage, guide tubes communicating with said compartments, a cut-off controlling the passage of the wires from said guide tubes

to the rack, and means for vibrating the wires to keep the same loosened up in the hopper compartments.

6. A machine for filling racks with wires to be coated comprising a frame provided with rack supporting means, a carriage mounted to travel upon the frame, a plurality of hopper compartments upon the carriage, guide tubes communicating with said compartments, a cut-off controlling the passage of the wires from said guide tubes to the rack, and bumpers upon the frame adapted to be engaged by the carriage to vibrate and loosen up the wires within the hopper compartments.

7. A machine for filling racks with wires to be coated comprising a frame provided with rack supporting means, a carriage mounted to travel upon the frame, a plurality of hopper compartments upon the carriage, guide tubes communicating with said compartments, a cut-off controlling the passage of the wires from said guide tubes to the rack, and adjustably mounted bumpers upon the frame adapted to be engaged by the carriage to vibrate and loosen up the wires within the hopper compartments.

8. A machine for filling racks with wires to be coated comprising a frame provided with rack supporting means, a carriage mounted to travel upon the frame, a plurality of hopper compartments upon the carriage each provided at its lower end with a guide passage of restricted size, guide tubes arranged below the hopper compartments and communicating with said passages, and a reciprocating cut-off controlling the feed of the wires from said tubes.

9. A machine of the character described including rack holding means, a carriage arranged above and movable into and out of alignment with the rack, hoppers upon the carriage, guides communicating with said hoppers, a cut-off controlling the guides, and means for vibrating the wires in the hoppers.

10. A machine for filling racks with wires to be coated, comprising a frame for supporting a rack having clamping members, hoppers supported upon the frame above the rack for feeding the wires downward through the spaces between the clamping members of the rack, means for opening and closing the clamping members of the rack, and means for supporting the wires extending through the rack prior to the clamping thereof.

11. A machine of the character described

comprising a frame provided with a plurality of rack supports, track rails upon the frame common to said supports, a carriage mounted to travel upon said track rails so as to be disposed at will above the racks upon the respective supports, and wire holding and feeding means upon the carriage.

12. A machine of the character described comprising a frame having rack receiving openings on opposite sides of the transverse center thereof, a carriage arranged to travel upon the frame to a position above either of said openings, wire holding and feeding means upon the carriage, and means upon the frame and cooperating with the carriage for vibrating the wires in the holding means.

13. A machine of the character described comprising a frame having a rack receiving opening therein, a rack adapted to be supported in said opening and having adjustable clamping members, a perforated guide upon the frame below the rack, a perforated cut-off cooperating with said guide, and a carriage mounted to travel upon the frame into and out of registry with the rack and provided with wire holding and dropping means.

14. A machine of the character described comprising a frame, rack supporting means upon the frame, filling means for filling the rack with wires, a dropper disposed below the rack, and a cut-off for supporting the wires and permitting passage of the same from the rack to said dropper.

15. A machine of the character described comprising a frame, rack supporting means upon the frame, filling means for filling the rack with wires, a dropper disposed below the rack and having a plurality of dropper tubes of determined area, a perforated guide plate between the rack and dropper tubes and having its perforated portion blocked off into spaces registering with the respective tubes for the supply of a determined number of wires to each tube, and a perforated cut-off plate cooperating with said perforated guide plate.

16. A machine of the character described comprising a frame provided with means for supporting a plurality of racks to be filled, and wire holding and feeding means mounted upon the frame for movement for cooperation with the respective racks.

In testimony whereof I affix my signature.

AARON JEDEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."